Entry of these amendments is believed to overcome the informalities noted by the PCT Examiner.

Respectfully submitted,

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Enc: Attachmetns A-1, A-2, A-3, A-4
Substitute drawing Fig. 1

Page 5, amend paragraph 20 as follows:

[0020] The system shown schematically in Fig. 1 comprises optical tracking beam analysis components 30 similar to those employed for reading compact discs known in the audio and data storage arts. Briefly, a pair of laser diodes generate parallel beams of light 31 and 32. One beam is employed by the analysis system for locating and tracking lines of the target entities. The other beam is used for detecting the presence of collected target entities adjacent to a located line. Relative motion between the cartridge 21 and the optical elements of the analysis system is provided by a mechanical translation unit 35 which has an aperture 34. Coordination of the functions of the analysis system is provided by a microprocessor (not shown). The tracking beam 31 which is reflected by dichroic mirror 36 through the aperture 34 is focused upon the upper surface of the cartridge 21 by an objective **[lens 37]** **lens 371**. The detecting beam 32 is reflected by the dichroic mirror 37 through the dichroic lens 36 and the objective **[lens 37]** **lens 371**.

Page 6, amend paragraph 23 as follows:

[0023] When in the orientation shown in Fig. 1, the cartridge 21 has a domed body portion 51 having outwardly projecting glides 52 and 53 on opposite sides thereof. The glides 52 and 53 are designed to slide into **[guideways 54 and 55]** **guideway 54** in the receptacle so that the domed body portion of the cartridge underlies the lower surfaces of the poles 22 and 23. Intermediate the **[guideways 54 and 55]** **sides of the guideway 54**, the receptacle has a slot **or aperture** 56 providing an optical path through the bottom of the receptacle. The optical path registers with the longitudinal centerline of the cartridge when the cartridge is inserted into position within the receptacle 20. The cartridge has a handle portion 61 for enabling the insertion and removal of the cartridge into and from the receptacle. The cartridge is formed of a non-magnetic inert material, such as polycarbonate, polystyrene or acrylic with no fluorescent additives and is formed to provide a rigid chamber which may be manipulated into and out of the optical path of the optical analysis system. The cartridge has a flat land surface 62 at the top of the dome 51 and the body of the receptacle provides a test chamber 63 underlying the land surface 62. When positioned in the receptacle 20, the test chamber 63 is aligned with the aperture 56 of the receptacle along the light path of the detecting apparatus in which the receptacle 20 is mounted, and to this end, the land surface 62 is optically clear to provide an analytic viewing surface.

[0020] The system shown schematically in Fig. 1 comprises optical tracking beam analysis components 30 similar to those employed for reading compact discs known in the audio and data storage arts. Briefly, a pair of laser diodes generate parallel beams of light 31 and 32. One beam is employed by the analysis system for locating and tracking lines of the target entities. The other beam is used for detecting the presence of collected target entities adjacent to a located line. Relative motion between the cartridge 21 and the optical elements of the analysis system is provided by a mechanical translation unit 35 which has an aperture 34. Coordination of the functions of the analysis system is provided by a microprocessor (not shown). The tracking beam 31 which is reflected by dichroic mirror 36 through the aperture 34 is focused upon the upper surface of the cartridge 21 by an objective lens 371. The detecting beam 32 is reflected by the dichroic mirror 37 through the dichroic lens 36 and the objective lens 371.

[0023] When in the orientation shown in Fig. 1, the cartridge 21 has a domed body portion 51 having outwardly projecting glides 52 and 53 on opposite sides thereof. The glides 52 and 53 are designed to slide into guideway 54 in the receptacle so that the domed body portion of the cartridge underlies the lower surfaces of the poles 22 and 23. Intermediate the sides of the guideway 54, the receptacle has a slot or aperture 56 providing an optical path through the bottom of the receptacle. The optical path registers with the longitudinal centerline of the cartridge when the cartridge is inserted into position within the receptacle 20. The cartridge has a handle portion 61 for enabling the insertion and removal of the cartridge into and from the receptacle. The cartridge is formed of a non-magnetic inert material, such as polycarbonate, polystyrene or acrylic with no fluorescent additives and is formed to provide a rigid chamber which may be manipulated into and out of the optical path of the optical analysis system. The cartridge has a flat land surface 62 at the top of the dome 51 and the body of the receptacle provides a test chamber 63 underlying the land surface 62. When positioned in the receptacle 20, the test chamber 63 is aligned with the aperture 56 of the receptacle along the light path of the detecting apparatus in which the receptacle 20 is mounted, and to this end, the land surface 62 is optically clear to provide an analytic viewing surface.

Please amend claim 15 as follows:

15. (Amended) A cartridge containing a test chamber for use in apparatus for performing optical analysis of liquid specimens by optical observation, said apparatus having a receptacle for receiving the cartridge and positioning the test chamber of the cartridge in a field of observation of the apparatus to enable analysis of liquid within the test chamber, the apparatus having at least two magnetic poles positioned on opposite sides of the receptacle to apply a magnetic field to the cartridge, said cartridge comprising:

a body of translucent plastic adapted to be slidably engaged in the receptacle of the apparatus between said magnetic poles to position the test chamber in the magnetic field of said poles, said body having a domed cross section with a flat land area adapted to be positioned in the field of observation of the apparatus,

a test chamber underlying said flat land area and having a longitudinal axis adapted to be disposed vertically when liquid is inserted therein, and having a vestibule above said test chamber, an inlet between said test chamber and said vestibule, and a fill line located adjacent said inlet, said fill line determined by the surface of liquid inserted into said test chamber;

a stopper having a first seal adapted to sealingly seat in the inlet and close the same, said stopper having a distal end adapted to enter the inlet of the test chamber below the fill line before the first seal closes said inlet, said distal end having a thickness sufficient to displace liquid upwardly through said inlet and position the surface of the liquid in said vestibule prior to said first seal closing said inlet, said first seal, upon being seated in the inlet, precluding air entrapment within the test chamber;

said vestibule having a volume to form an overflow reservoir for receiving a volume of liquid that may be displaced upon seating the primary seal; and

a second seal remote form the first seal in said vestibule, said first and second seals defining therebetween the overflow reservoir, said second seal precluding migration of any overflow liquid past the second seal out of the **[system]** **cartridge**.

1. A method sealing a chamber to preclude air entrapment in a test liquid, comprising:

(a) providing an analytic chamber having a test chamber and an overflow reservoir;

(b) filling the analytic chamber to a fill line such that the test chamber is completely filled with liquid;

(c) seating a primary seal within the analytic chamber to form a seal interface that lies between the test chamber and the overflow reservoir within the liquid volume in the analytic chamber;

(d) retaining any evacuated liquid displaced upon seating the primary seal into the overflow reservoir; and

(e) sealing the overflow reservoir with a second seal to preclude voiding of the overflow reservoir and rupturing of the primary seal.

2. A method according to Claim 1 in which said step of filling the chamber with liquid includes

one step of introducing a test liquid into the chamber having a volume sufficient to fill the test chamber to a level below said fill line, and a second step of introducing a buffer solution having a density different from the density of the test liquid to the chamber, the combined volume of said test liquid and said buffer being sufficient to bring the surface of said combined liquids to said fill line, said test liquid and buffer solution providing a liquid interface within the test chamber having buffer solution on one side and test liquid at the other side,

said seating step displacing buffer solution from the one side of said liquid interface into said overflow reservoir, whereby all of said test liquid is retained in the test chamber, and air is excluded from the test chamber.

3. A method according to Claim 2 in which said overflow reservoir is above said test chamber and said buffer solution has a density not more than the density of the test liquid, including the steps of

connecting the overflow reservoir to the test chamber by an inlet adjacent to said fill line and spaced above the liquid interface, and

seating said primary seal in the inlet.

4. A method according to claim 1, including the steps of

providing a stopper having a primary sealing element adjacent its distal end and a second sealing element adjacent its proximal end,

inserting the stopper into and through the overflow reservoir to seat the primary sealing element between the test chamber and the reservoir, the distal end of said stopper displacing liquid from the test chamber into the reservoir, and thereafter

seating the second sealing element to seal the overflow reservoir.

5. A seal system for sealing a test chamber to preclude air entrapment in liquid inserted into the chamber, said system comprising:

(a) a test chamber having a longitudinal axis adapted to be disposed vertically as liquid is inserted therein, and having a vestibule above said test chamber, an inlet between said test chamber and said vestibule, and a fill line located adjacent said inlet, said fill line determined by the surface of liquid inserted into said test chamber;

(b) a stopper having a first seal adapted to sealingly seat in the inlet and close the same, said stopper having a distal end adapted to enter the inlet of the test chamber below the fill line before the first seal closes said inlet, said distal end having a thickness sufficient to displace upwardly liquid through said inlet and position the surface of the liquid in said vestibule prior to said first seal closing said inlet, said first seal, upon being seated in the inlet, precluding air entrapment within the test chamber;

(c) said vestibule having a volume to form an overflow reservoir for receiving a volume of liquid that may be displaced upon seating the primary seal; and

(d) a second seal remote form the first seal in said vestibule, said first and second seals defining therebetween the overflow reservoir, said second seal precluding migration of any overflow liquid past the second seal out of the system.

6. A system according to Claim 5 wherein said test chamber is separated from said vestibule by the top wall of the test chamber and wherein further said inlet is positioned within said top wall.

7. A system according to Claim 5 in which said stopper has a stem adapted to extend through said vestibule, with a distal end adapted to pass through said inlet of said test chamber and a proximal end adapted to be positioned above said vestibule, said first

seal being positioned on said stem adjacent the distal end, and the second seal being positioned on said stem adjacent the proximal end.

8. A system according to Claim 7 wherein said inlet comprises a tapered passage terminating in a cylindrical channel providing a seat for said first seal, and an upwardly open mouth providing a seat for the second seal, said first seal comprising a probe at the distal end of said stem adapted to pass through said tapered passage and into said cylindrical channel to seal the inlet, and said second seal comprising a plug adapted to sealingly engage in said open mouth.

9. A system according to Claim 8 wherein said cylindrical channel is disposed centrally in the top wall of said test chamber and has an internal diameter substantially smaller than the internal dimensions of the test chamber.

10. A system according to Claim 8 wherein the distance between the distal end of the probe and the plug is greater than the distance between the cylindrical channel and the mouth, whereby the probe completes the first seal before the plug effects the second seal.

11. A system according to claim 10 wherein said mouth is a socket, and said plug is a block complementary to said socket.

12. A system according to claim 10 wherein said stem has ribs extending between said probe and said plug.

13. A system according to claim 5 wherein said test chamber has longitudinal side walls of translucent plastic material with no fluorescent additives to enable optical analysis of the liquid inserted in the test chamber.

14. A system according to claim 13 wherein at least one of said longitudinal sidewalls of the test chamber is flat.

15. (Amended) A cartridge containing a test chamber for use in apparatus for performing optical analysis of liquid specimens by optical observation, said apparatus

having a receptacle for receiving the cartridge and positioning the test chamber of the cartridge in a field of observation of the apparatus to enable analysis of liquid within the test chamber, the apparatus having at least two magnetic poles positioned on opposite sides of the receptacle to apply a magnetic field to the cartridge, said cartridge comprising:

a body of translucent plastic adapted to be slidably engaged in the receptacle of the apparatus between said magnetic poles to position the test chamber in the magnetic field of said poles, said body having a domed cross section with a flat land area adapted to be positioned in the field of observation of the apparatus,

a test chamber underlying said flat land area and having a longitudinal axis adapted to be disposed vertically when liquid is inserted therein, and having a vestibule above said test chamber, an inlet between said test chamber and said vestibule, and a fill line located adjacent said inlet, said fill line determined by the surface of liquid inserted into said test chamber;

a stopper having a first seal adapted to sealingly seat in the inlet and close the same, said stopper having a distal end adapted to enter the inlet of the test chamber below the fill line before the first seal closes said inlet, said distal end having a thickness sufficient to displace liquid upwardly through said inlet and position the surface of the liquid in said vestibule prior to said first seal closing said inlet, said first seal, upon being seated in the inlet, precluding air entrapment within the test chamber;

said vestibule having a volume to form an overflow reservoir for receiving a volume of liquid that may be displaced upon seating the primary seal; and

a second seal remote form the first seal in said vestibule, said first and second seals defining therebetween the overflow reservoir, said second seal precluding migration of any overflow liquid past the second seal out of the cartridge.

16. A cartridge according to claim 15 wherein said test chamber has a volume of at least 315 μl and said vestibule has a volume of at least 95 μl when the first of said stopper seals is seated in the inlet and the second seal is precluding migration of any overflow liquid past the second seal.

17. A cartridge according to claim 15 wherein said test chamber has a volume in the range of 22 ml to 675 μl.

18. A cartridge according to claim 15 wherein said test chamber has a cross-

sectional area in the range of 10 to 14 square millimeters and the inlet has a diameter of 2.35 mm.